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Strengthening the evidence and action on multi-sectoral partnerships in public health: an action research initiative

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Abstract

Introduction: The Public Health Agency of Canada's *Multi-sectoral Partnerships Initiative*, administered by the Centre for Chronic Disease Prevention (CCDP), brings together diverse partners to design, implement and advance innovative approaches for improving population health. This article describes the development and initial priorities of an action research project (a learning and improvement strategy) that aims to facilitate continuous improvement of the CCDP's partnership initiative and contribute to the evidence on multi-sectoral partnerships.

Methods: The learning and improvement strategy for the CCDP's multi-sectoral partnership initiative was informed by (1) consultations with CCDP staff and senior management, and (2) a review of conceptual frameworks to do with multi-sectoral partnerships. Consultations explored the development of the multi-sectoral initiative, barriers and facilitators to success, and markers of effectiveness. Published and grey literature was reviewed using a systematic search strategy with findings synthesized using a narrative approach.

Results: Consultations and the review highlighted the importance of understanding partnership impacts, developing a shared vision, implementing a shared measurement system and creating opportunities for knowledge exchange. With that in mind, we propose a six-component learning and improvement strategy that involves (1) prioritizing learning needs, (2) mapping needs to evidence, (3) using relevant data-collection methods, (4) analyzing and synthesizing data, (5) feeding data back to CCDP staff and teams and (6) taking action. Initial learning needs include investigating partnership reach and the unanticipated effects of multi-sectoral partnerships for individuals, groups, organizations or communities.

Conclusion: While the CCDP is the primary audience for the learning and improvement strategy, it may prove useful for a range of audiences, including other government departments and external organizations interested in capturing and sharing new knowledge generated from multi-sectoral partnerships.

Keywords: multisectoral partnerships, collaboration, continuous improvement, learning

Highlights

- Multi-sectoral partnerships for complex health issues are not new, yet our understanding of them is limited.
- The authors created a learning and improvement strategy to maximize the knowledge and impact of PHAC's multi-sectoral partnership initiative and to explore novel and time-sensitive questions not routinely captured through monitoring and evaluation.
- The strategy highlights the importance of understanding partnership impacts, developing a shared vision, implementing a shared measurement system and creating opportunities for knowledge exchange.
- This strategy will help collect relevant, timely data to improve PHAC efforts and contribute to the evidence base on multi-sectoral partnerships for use by a range of audiences.

Introduction

Co-operative and co-ordinated action across multiple sectors, including public and private institutions, is required to effectively address the most challenging public health issues, including the primary prevention of chronic diseases.[1-4] These joint efforts are built on the premise that no individual organization or sector has the sole responsibility or capacity for improving population health. It is only through collaborative ventures that make best use of available resources, skills and talents that lasting advancements may be made in the prevention and control of chronic diseases such as cancers, heart disease and mental illness.[4-8]

Consistent with this perspective, the Public Health Agency of Canada's (PHAC) Centre for Chronic Disease Prevention (CCDP) launched the Multi-sectoral Partnerships to Promote Healthy Living and Prevent Chronic Disease initiative in 2013 (http://www.phac-aspc.gc.ca/fo-fc/mspphl-pppmvs-eng.php). This initiative supports multiple partnership projects involving public and private organizations to advance the use of evidence-informed interventions that address common risk

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factors for chronic disease.[9] To maximize the insights from this initiative, the CCDP has developed a learning and improvement strategy that will explore novel and time-sensitive questions not routinely captured through monitoring and evaluation.

In this article, we describe the components of the learning and improvement strategy for multi-sectoral partnerships, the procedures used for its development, and the CCDP's initial learning priorities.

Multi-sectoral Partnerships to Promote Healthy Living and Prevent Chronic Disease

The Multi-sectoral Partnerships to Promote Healthy Living and Prevent Chronic Disease initiative, administered by the CCDP, matches federal investments with those of private, not-for-profit and charitable sectors to diversify and increase the financial investments in chronic disease prevention, to share potential risks and mutual benefits among participating organizations and to increase the reach and impact of chronic disease prevention interventions. The initiative enables partners to co-create, co-invest and, increasingly, to co-manage projects.

To implement this initiative, the CCDP has transformed certain elements of its grants and contributions investments. For example, it has moved away from a traditional, time-limited solicitation, where applicants would be accepted only at certain times each year, to a two-step continuous intake that allows for ongoing partnership and project development. In addition, a pay-for-performance model has been implemented to improve program accountability: payments are made when jointly negotiated project milestones are reached. Milestone payments are based on project outputs and can include implementing an intervention in an agreed number of locations, completing evaluation requirements (e.g. submitting all baseline data) or developing project resources (e.g. a web portal, mobile app or trainer hub that support overall project goals). Further, to support the development of a strong evidence base for funded projects, the CCDP has put into place a way to consistently collect data on behaviour change, with options for projects to explore social return on investment.

Since launching in February 2013, the initiative has implemented 22 partnership projects (targeting physical activity, healthy living, tobacco use and injury prevention or addressing multiple risk factors) and has secured more than $38 million in leveraged funds.

Benefits and challenges of multi-sectoral partnerships

While multi-sectoral partnerships are important parts of the public health infrastructure in Canada and elsewhere,[10-16] what remains challenging is defining what constitutes a partnership; managing their risks and benefits; assessing their structures, processes and outcomes; and improving their performance.

Partnerships are often considered to be dyadic connections between organizations that involve "the sharing of power, work, support and/or information with others for the achievement of joint goals and/or mutual benefits."[17,p.61] These connections are the foundations of other collaborative structures, including networks ("a group of three or more organizations connected in ways that facilitate achievement of a common goal"[4]); alliances (which "typically refer to dyadic partnerships that are simpler and short term in nature than is seen in networks"[4]); and community coalitions (which "represent defined communities and their memberships and reflect the diversity and wisdom of those communities at both grassroots and "grass-tops" [professional] levels."[18] Within each collaborative structure, participating organizations demonstrate similarities and differences in three dimensions: the sectors they represent, the resources they bring and their particular area of focus.

Despite differences between these collaborative initiatives, partnerships share a range of benefits and risks. This is particularly the case with those partnerships that involve public and private organizations, such as Right to Play Canada, Partnership for a Healthier America, Canadian Active After School Partnership and Let's Move! Active Schools.[1,3,19-28] Cited benefits include a greater capacity to share risks and benefits; reaching more target individuals, organizations, sectors and communities; and, through partnership agreements, improved cross-sector engagement and accountability among all participating organizations.[2] For partnerships that involve large private organizations, concerns exist over industry partners' motives and potential conflicts of interest; mismatches between private company products and community needs; distortion of government priorities by private sector interests; negative impacts on reputation, particularly for public or non-profit sectors; power imbalances between partner organizations; and loss of autonomy, particularly for less powerful partners.[1,23] Developing, evaluating and sharing the experiences of those involved in brokering, managing and monitoring multi-sectoral partnerships is therefore an important step toward improving our understanding of how such partnerships operate in different settings and with different partners and their short- and long-term impacts on people and populations.

An opportunity for learning and improvement

On behalf of PHAC and consistent with its imperative for evidence-informed action, the CCDP is investing in a learning and improvement strategy to better understand multi-sectoral partnerships in public health for continuous improvement and to strengthen the evidence base related to partnerships. Other centres within PHAC; other departments, agencies, crown corporations or special operating agencies within the government; or other organizations (e.g. research funding agencies, universities, philanthropic foundations, private industries) with interests/responsibilities in learning about and improving multi-sectoral partnerships will also gain from this strategy. There are strong disciplinary traditions for this work, including organizational learning, that highlight the processes that enable individuals and institutions to change their mental models, norms, strategies and assumptions.[29,30] As Senge[29] noted, learning organizations are those "where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are

nurtured, where collective aspiration is set free, and where people are continually learning to see the whole together."[29,p.3] Drawing on those factors known to influence learning organizations (e.g. team learning, systems thinking, building shared vision), this article describes the development and key elements of the CCDP's learning and improvement strategy for multi-sectoral partnerships, and outlines initial priorities for implementation.[29,30]

Methods

The development of the learning and improvement strategy was informed by

- CCDP staff involved in the initial design and implementation of the multi-sectoral partnerships initiative, and
- a review of conceptual frameworks of multi-sectoral partnerships.

Consultations with CCDP staff

Consultations with the CCDP staff, led by CDW and JKG, were conducted on 21 March, 2014. A consultation guide was developed based on discussions with project leads and reviews of CCDP orientation materials (i.e. *Partnership Guide*, *Decision-Making Framework to Assessing Potential Partners*, *Guidance for Contribution Funding Recipients – Measuring Impact*), and recent PHAC and policy documents. The consultation guide contained a series of questions to elicit participants' experiences with multi-sectoral partnerships, the intended impacts of PHAC's multi-sectoral initiative, the strengths and challenges of the existing partnership's monitoring and evaluation approaches, the areas of uncertainty that may be addressed through existing literature on multi-sectoral partnerships, the initial learning priorities, and the desirable characteristics of a learning and improvement initiative for the CCDP's multi-sectoral partnerships.

Seventeen CCDP staff members participated in the consultations through four focus groups, each with two to ten participants. Relevant groups were identified as those with existing knowledge and experiences in implementing or evaluating the multi-sectoral partnership initiative. Based on these criteria, individuals from the following were invited to participate in focus groups: those with broad oversight of the program (Director General and Senior Director); members of the Partnerships and Strategies Division; members of the Performance Measurement Division; and members of the Interventions and Best Practices Division.

The notes from the four in-person focus group discussions, cofacilitated by CDW and JG, were consolidated into a single file. A thematic analysis was performed across all focus groups to eliminate redundancies and allow overarching themes to emerge. Key themes of interest were identified by multiple groups across the consultations or chosen because senior leadership teams considered them very important. These emerging themes were discussed and refined with a working group of eight CCDP employees who were also involved in the focus groups. These individuals were selected based on their different roles and responsibilities (e.g. partnership brokering, evaluation, ongoing management and monitoring, contracts), their depth of knowledge and experience; and their ability to foster change.

Review of conceptual frameworks relevant to multi-sectoral partnerships

With the findings from the consultations, the CCDP working group and researchers from the Propel Centre for Population Health Impact jointly developed the aim of the review: to identify and describe relevant frameworks and/or conceptual models useful for understanding and explaining the characteristics, functions and impacts (intended and unintended) of multi-sectoral partnerships. For the purpose of this review, partnerships could be dyadic connections between organizations (from any sector) as well as connections between more organizations (often considered an inter-organizational network).

Search strategy

We limited our search strategy to peer-reviewed and grey literature published in English in 2000 or later and searched five electronic databases: PubMed, Academic Search Premier, ABI/Inform, Scopus and Web of Science. The strategy, adapted to each database, used a combination of controlled vocabulary and free-text terms (see Table 1). Search terms were grouped into three broad categories to do with frameworks or models, multi-sectoral initiatives and organizational partnerships. Searches for each group were conducted individually and then combined to identify conceptual models relevant to partnerships with multi-sectoral representatives.

A reviewer removed irrelevant articles based on an initial screen of article titles, and two reviewers screened the abstracts of the remaining articles, resolving any disagreements via open discussion. (See Table 2 for the inclusion and exclusion criteria used.) Articles that did not describe a framework, conceptual model or theoretical model relevant to understanding multi-sectoral work and/or

TABLE 1
Search term groupings

Group 1	Group 2	Group 3
framework	multi-sectoral	partnership
model	multi-stakeholder	network
concept	inter-organizational	collaborative
method	interagency	platform
theory	inter-sectoral	alliance
theories	cross-sectoral	system
impact		
effectiveness		
outcome		
performance		

TABLE 2
Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Document describes a framework, conceptual model or theoretical model relevant to understanding multi-sectoral work and/or multi-organizational work	Article does not describe a framework, conceptual model or theoretical model
	Document describes a framework, conceptual model or theoretical model that was not related to understanding multi-sectoral or multi-organizational work
	Document focusses solely on a clinical issue or group (e.g. disease specific, targeting a professional group)

multi-organizational work or that had a sole focus on a clinical issue or group (e.g. disease specific, targeting a professional group) were excluded.

We also conducted a grey literature search of the websites of the FSG, the National Collaborating Centre Methods and Tools, Stanford Social Innovation Review and Tamarack Institute for Community Engagement for reports and publications that described the application of relevant frameworks to multi-sectoral initiatives and/or the development of learning and improvement strategies for multi-sectoral partnerships. In addition, we did an Internet search using Google (https://www.google.ca/) and DuckDuckGo (https://duckduckgo.com/) for combinations of key terms from the database search. The team reviewed the first five pages of each search and identified relevant documents. We applied the same criteria used for screening peer-reviewed literature to the website review and Internet search (Table 2).

Data extraction and synthesis

We extracted the following information from each of the relevant documents identified in the search: framework name; framework purpose and/or perspective; critical components/success factors; and domains of evaluation (including examples of respective indicators, where provided). We grouped frameworks according to macro-, meso- and micro-perspectives. Macro-level frameworks provide high-level guidance to understand the social impact of multi-sectoral collaboration. Meso-level frameworks describe how collaboration works and the factors that are important for organizing partnerships. Micro-level frameworks provide the broad domains necessary for understanding how partnerships work as well as more specific, individual indicators, tools or measures of partnership activity.

We categorized frameworks with elements from more than one level according to the highest level of application.

Information for each framework was extracted, tabulated and summarized using a narrative initiative.

Development of the learning and improvement strategy

During consultations, CCDP staff began to uncover the practical challenges of brokering, implementing and evaluating multi-sectoral partnerships and the broad areas where information is not routinely gathered during standard monitoring and evaluation activities. CCDP staff were also interested in improving their understanding of the critical success factors of inter-organizational partnerships, key measurement domains and partnership performance assessment techniques. Based on these interests, the literature review focussed on partnership frameworks that summarized the concepts that relate to multi-sectoral partnerships. To blend the practical insights gained from the CCDP consultations with the conceptual insights from the literature review, we developed an overarching strategy that built on current knowledge of multi-sectoral partnerships and responded to the specific needs of CCDP staff. Information about learning cycles[31] and continuous quality improvement[32] helped generate a strategy that is flexible, iterative and tailored to the specific context of multi-sectoral partnerships, with 3- to 4-month long prioritized learning cycles that ensure responsiveness to time-sensitive issues and the best use of existing resources.

A draft strategy was developed by the joint CCDP–Propel team and refined through discussions with 33 members of the CCDP.

Results

Consultations

The consultations identified a range of concepts, ideas and needs related to PHAC's multi-sectoral partnership initiative, including understanding partnership impact, design, performance, development and improvement. In particular, the consultation process highlighted three key themes:

(1) Some of the impacts of the multi-sectoral partnership initiative and its projects are captured in the short- and long-term outcomes measured by the initiative's performance measurement system. Others may include leverage (e.g. resources, skills, reputation, credibility, funds), program reach, sustainability of interventions, support of social innovation, social return on investment and PHAC credibility (both internal and external to government). Multiple effects, both positive and negative, may exist, for example, greater capacity within partnering organizations (e.g. in generating social value); new staff skills built in partnering organizations (e.g. in evaluation skills); improved use of technology (e.g. improving data capture and monitoring techniques); potential widening of health inequalities based on socioeconomic conditions, culture or geographic location; and restrictive focus on individual health practices rather than population health approaches.
(2) The CCDP (e.g. in the Partnerships and Strategies Division and the Executive Office, among senior managers) has a wealth of practice-based knowledge on types of partners and partnerships, what works for these partnerships (and what does not), for whom this is working, under what circumstances and why. This knowledge relates to how to initiate, establish, support, modify, measure, govern and assess

multi-sectoral partnerships at different stages of development, as well as how the organizational structure or design of the CCDP and PHAC helps or hinders existing practice. Tools, templates and processes to inform decision-making exist; however, highly relevant practitioner knowledge is not being systematically captured, shared or used to explain, understand and improve multi-sectoral partnerships.

(3) Given the current focus on implementing the multi-sectoral partnership initiative and its projects, there have been few opportunities to reflect, learn and act on the existing knowledge, assets and experiences within the CCDP. This includes identifying and filling gaps in knowledge, skills and training—and in a timely fashion. Given PHAC's mandate, the natural experiment provided by the multi-sectoral initiative and the growing call for new knowledge on cross-sector engagement for population health improvement, the need to reflect on and learn about experiences in real time was considered particularly important.

Frameworks review

The search strategy identified 5363 articles, of which 5066 were screened out following a review of titles, leaving 297 for abstract/full text review. During the full text review, 204 were excluded, leaving 93. We screened search results a second time to identify the most relevant and recent articles and eliminate duplication, and excluded 17 papers published before 2007. Finally, we reviewed the remaining 76 papers for relevancy and/or inclusion of the equivalent of a framework and excluded 56.

The grey literature search identified 26 documents, of which 12 were excluded as per set criteria, for a total of 14.

In total, we reviewed 34 articles on 19 unique frameworks relevant to developing a learning and improvement strategy for multi-sectoral partnerships. Table 3 lists the 19 macro-, meso- and micro-level frameworks included in this review.

Macro-level frameworks

Macro-level frameworks describe the role of collaboration in driving positive social change and the factors critical to assessing large-scale change initiatives. Such frameworks may help capture and describe the broad goals of PHAC's multi-sectoral initiative, which can then be linked to specific aspects of funded partnership projects. Macro-level frameworks include social innovation,[33,34] shared value[35-37] and collective impact.[38-42] (Note: we have clustered collective impact with other macro-level frameworks; however, we recognize that it demonstrates characteristics consistent with meso- and micro-level frameworks.) While a full discussion of each framework is beyond the scope of this review, this summary highlights each framework's key perspectives, how it positions multi-sectoral work and the insights it provides into learning and improvement strategies for multi-sectoral partnerships.

Social innovation is the pursuit of "a novel solution to a social problem that is more effective, efficient, sustainable or just than existing solutions and for which the value created accrues primarily to society as a whole rather than private individuals."[43] Le Ber and Branzei[34] illustrated that partnerships are a critical component of social innovation and highlight the importance of relational attachment between partners, partner complacency and partner disillusionment. Nurturing multi-sectoral relationships requires partners to continually re-align roles and relationships as contexts, circumstances and conditions change.

In contrast, shared value promotes investments in long-term business competitiveness while promoting social and environmental objectives.[35] For those partnerships convened to generate shared value, multi-sectoral partnerships are thought to provide critical tools for achieving both business outcomes (e.g. increased revenue, market share, profitability) and social outcomes (e.g. improved care of patients, reduced carbon footprint, improved job skills).[37]

Compared to shared value and social innovation frameworks, collective impact focusses on multi-sectoral partnerships, which are thought to be influenced by five core conditions: a common agenda; shared

TABLE 3
Macro-, meso- and micro-level frameworks

Macro-level frameworks	Meso-level frameworks	Micro-level frameworks
Social innovation	Systems change framework	Propositional inventory for the design and implementation of cross-sectoral collaboration (specific application in leadership)
Shared value	Framework to guide strategy development for non-profit organizations	Framework and process for collaborative action in public health
Collective impact	Grounded model for analyzing formation in cross-sectoral work	RE-AIM framework for impact assessment of multi-sectoral partnerships
	Propositional inventory for the design and implementation of cross-sectoral collaboration	The collaboration and evaluation and improvement framework
	An integrated framework for collaborative governance	Framework for understanding the performance effects of inter-organizational networks
	Framework of organizational outcomes for community collaboration	Framework for assessing effectiveness of health promotion networks
	Framework of antecedents, process and perceived effectiveness of inter-organizational collaborations for public service delivery	Multi-level performance indicators for multi-sectoral networks and management
	Collaborative value creation framework for analyzing non-profit and business partnerships	
	Key initiatives and frameworks for health and social care partnerships	

measurement systems; reinforcing activities; continuous communication; and the support of a backbone organization.[39-41] Underlying the success of collective impact initiatives is a continuous learning process built on shared measurement and ongoing evaluations, which capture process and outcome indicators matched to the stage of partnership evolution.[41]

Meso-level frameworks

In this review, we consider meso-level frameworks as those that focus explicitly on the workings of partnerships. The meso-level frameworks listed in Table 3 differ in their specific focus, such as the formation of partnerships, the success factors that drive them and the expected outcomes/impacts. Common themes across the frameworks relate to the importance of context; the need to clearly identify the problem; the processes necessary for building and maintaining partner engagement; the importance of understanding and interacting; and links to partnership outcomes.

Context

Context may be considered from both an outer and inner perspective. Outer context is the external setting, including the norms, resources, regulations and operations of societies, as well as existing policy, political and legal conditions that affect a partnership.[12,44,45]

Inner context includes existing corporate and organizational cultures, structures and policies that may be influenced by organizational members[12] and how the characteristics of individual organizations and history of interactions influence partnerships and their outcomes.[46]

Identifying and framing the problem

Multiple meso-level frameworks highlight how important it is to understand the issue or problem the multi-sectoral partnership is addressing as well as its boundaries (i.e. what is contained in the given system, such as organizations, relationships, histories and cultures).[44] Successful partnerships engage different stakeholder groups in an explicit process that aims to incorporate diverse perspectives; this may include developing purpose statements and mandates, committing resources and agreeing on decision-making structures.[13,44]

Partnership processes

Partnership processes form the daily activities of partnership work and involve forging agreements, building leadership and legitimacy, fostering trust among partners, managing conflict and planning for ongoing partnership activities.[13] The collaborative value creation framework matches partnership processes with stages of partnership evolution; it suggests that, as collaborative structures move toward transformational forms, relationship structures shift to more sharing of resources, more intense interactions, higher strategic values and greater engagement in opportunities for innovation.[10,11] Specific processes may include delivering educational/training sessions, marshalling external resources or monitoring implementation activities.[45] Within the different stages of partnership development (e.g. formation, selection, implementation, design and operations, institutionalization), many subprocesses exist, such as mechanisms for mapping organizational fit, undertaking formal and informal risk management processes and exploring different structures and design features to enable experimentation in the pursuit of shared value (such as convening groups for joint decision making, building trust and navigating organizational autonomy[47]).

Interactions

Many frameworks recommend examining interactions between components of partnerships to understand and improve the function of the partnership. Interactions may be understood by examining inter-organizational alignment; relative strengths and weaknesses of organizations (competitors and collaborators); barriers between organizations; and power imbalances.[12] The Systems Change Framework identifies distinct processes for examining interactions between system parts, including how these interactions may be used to identify points for leveraging change.[44] Introducing processes that map interactions between organizations may be an important step towards a more sophisticated understanding of how multi-sectoral relationships operate within broader social contexts.

Partnership outcomes

Partnership outcomes may be considered as first order outcomes (short-term results of partnership work); second order outcomes (e.g. co-ordinated action, changes in practice or changes in perceptions); and third order outcomes (e.g. co-evolution, the formation of new institutions, and new norms).[13] Outcomes may also include intentional and unintentional changes in desired states, the development of new social goods or technological innovations, improved inter-organizational learning, increased interaction among organizational members, greater capacity to access resources, increased ability to serve clients (if service provision is an activity) and improved problem-solving capacity.[48] Given this diversity, it is critical that outcome measures are appropriate for a given partnership and its stage of development.

Micro-level frameworks

Micro-level frameworks provide the broad domains necessary for understanding partnership work as well as more specific indicators of partnership activity (including specific data-collection tools).

Of the micro-level frameworks reviewed, three relate to inter-organizational networks,[49-51] while the remainder are more broadly relevant to collaboration and partnerships. From this broader perspective, the framework and processes for collaborative action in public health identify five domains necessary for partnership work: assessment and collaborative planning, implementing targeted actions, changing conditions in communities and systems, achieving change in behaviour, and improving health and health equity.[52] These domains include explicit indicators of success, such as the presence of a common purpose, clearly articulated logic models, explicit roles, and designated and distributed leadership.

While long-standing challenges exist in establishing causal links between network co-ordination and performance, Gulati et al.[49] proposed three domains for understanding network success—reach, richness and receptivity—and provide specific indicators for each, such as distance between partners, trust, commitment and tie multiplexity. In contrast, the Health Promotion Networks Framework[50] focusses on structure, process and effectiveness, with potential indicators

including age, size and network form; processes facilitated by the network, such as advocacy, training and raising public awareness; effects to do with organizational learning; and changes in practice. Finally, the Collaborative Evaluation Improvement Framework[53] describes specific data-collection strategies for mapping network effectiveness: mapping team and decision-making procedures; conducting interviews, surveys and document analyses to better understand internal processes; and collecting data on the quality of team interactions through specific tools (e.g. Levels of Organizational Integration Rubric [LOIR][53] and the Team Collaboration Assessment Rubric [TCAR][53]).

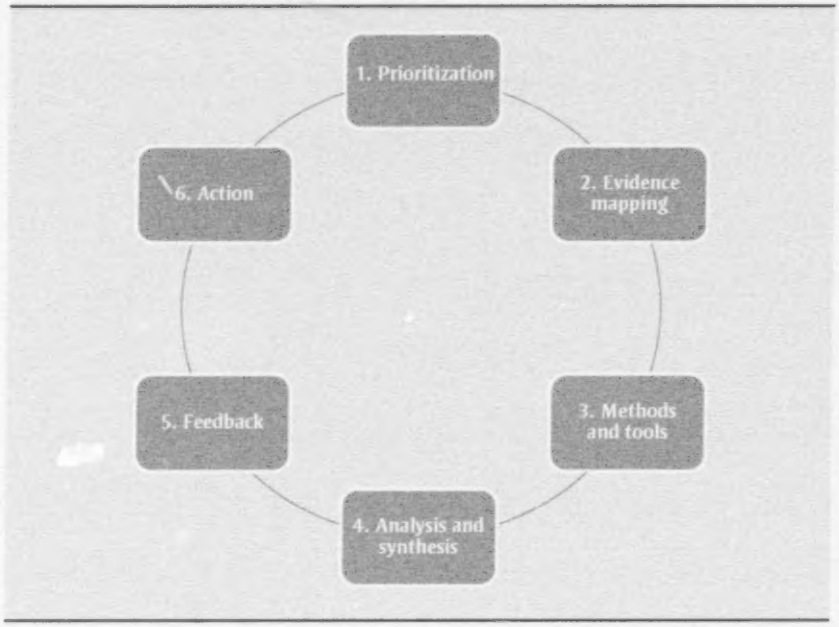
Learning and improvement strategy

Figure 1 shows the CCDP's six-phase learning and improvement strategy for the multi-sectoral partnerships initiative. These learning cycles, mapped to Kolb's[31] stages of learning (feeling, observing, thinking and doing), enable the CCDP to rapidly prioritize guiding questions relevant to multi-sectoral partnerships, collect and analyze necessary information informed by evidence-based practice and package information in formats useable to CCDP staff (and potentially others).

1. Prioritization—Refining and prioritizing learning and improvement needs to do with multi-sectoral partnerships.

Initial consultations with CCDP staff provided an overview of the CCDP's multi-sectoral initiative and helped identify a number of potential directions for learning and improvement (see Figure 2). These learning needs, informed by the initial assumptions guiding the multi-sectoral initiative (e.g. improving reach, use of resources and amplifying impact), provide useful starting points for developing specific questions to explore through a learning and improvement strategy. Ongoing development of these questions requires engaging with individuals and teams from the CCDP and, potentially, with organizations partnering with the CCDP through multi-sectoral partnership projects. Such prioritization processes may involve in-person workshops or modified Delphi processes for gathering large group perspectives.[54]

FIGURE 1
Components of a learning and improvement strategy



2. Evidence mapping—Mapping of prioritized learning needs against existing partnership frameworks.

Phase 2 draws on relevant literature to help decide how the CCDP's learning needs will be addressed, including how problems would be defined and solved. This involves mapping prioritized areas to relevant partnership frameworks using a number of alignment criteria, including the level at which information is desired, the stage of partnership evolution and the level of detail required. For example, a key learning need for the CCDP relates to understanding the reach of existing multi-sectoral partnership projects. Initial mapping to conceptual partnership frameworks helps identify different aspects of reach (e.g. to target individuals, organizations, sectors, communities), factors influencing the reach and how this knowledge may be used to continuously improve the CCDP's partnership initiative.

3. Methods and tools—Identifying methods and tools for gathering information to address multi-sectoral partnership learning needs.

The reviewed frameworks provide direction on how a learning need of a multi-sectoral engagement might be framed, as well as the tools for gathering relevant data. Among the primary considerations are the levels at which information is sought (broad initiative, project and/or organization) and the stage of development of the partnership project. According to the literature on learning organizations, organizational-level information may focus on organizational roles, internal organizational structures and processes, organizational benefits from partnering or organizational learning culture. For example, for the CCDP's initial learning priority, which focussed on reach, relevant information may be collected from existing assets, including existing project reports and key informant interviews with CCDP, PHAC staff and external partners.

For project-level information, key foci may include mapping inter-organizational relationships within partnership projects; identifying and mapping communities of practice within partnership projects; and monitoring stages of collaboration within partnership projects. These domains may be explored to understand how individuals and organizations within partnership projects work with each other; the available communication channels; and the frequency and intensity

FIGURE 2
Initial learning needs

- Understanding and sharing the perspectives of the Agency as well as those of partnering organizations
- Examining how the internal organizational design (including key corporate functions) of the Agency influences multi-sectoral work, and the success of projects, as well as how it might need to be adapted
- Demonstrating the credibility of the multi-sectoral concept and the role of government in the initiative
- Demonstrating how private sector finances and in-kind contributions are leveraged for creating social value and behaviour change
- Examining how this way of working helps create opportunities for social innovation
- Demonstrating that a multi-sectoral approach has reach and impact on the behavioural and environmental determinants of health
- Investigating the unintended consequences resulting from this program (both positive and negative)
- Exploring how partnerships might be created in challenging situations/circumstances, e.g. Aboriginal health and/or workplace settings
- Examining the skill sets needed to be able to find and broker partnerships: What are those skills? Do PHAC staff have them? Could they be improved? What training might be useful?
- Exploring features of the pay for performance system, such as relevance of targets/measures
- Identifying how partnering organizations might share information within their own organizations/networks

of communications within partnership projects.[55] To gather information about these project-level foci, newer data-collection approaches (such as social network analyses) may be useful alongside traditional qualitative and quantitative techniques.[53]

At the broad initiative level, information from across the suite of partnership projects may be required to provide the CCDP with insights into the early stages of partnership formation, including the core conditions (and linked indicators) of collective impact, such as shared agenda setting and shared measurement. To capture information on the CCDP's multi-sectoral initiative, relevant indicators may include how partners and the broader community understand and articulate the problem; the degree to which partners understand how they will participate in the shared measurement system; and observed changes in partners' activities to align with the shared plan of action.[41] In contrast, for partnerships at mid/late stages of development, initiative-level information may focus more on outcomes using techniques such as outcome mapping or "most significant change" to help describe initiative impacts.[56] This learning and improvement strategy provides the CCDP with important opportunities to develop, test and refine indicators for measuring partnership effectiveness.

4. Analysis and synthesis—Analyzing and synthesizing information: using relevant analytical lenses.

Phase 4 of the strategy applies relevant and rigorous methods for analyzing and synthesizing diverse information from different settings and methodologies. For example, realist synthesis can help build an understanding of what works, as well as how and why different activities produce certain effects in specific settings.[57] Applying a realist lens helps bring together a diverse set of evidence and generates policy guidance that may serve as useful input into group sense-making discussions (the collective interpretation of new information) for the CCDP. Using feedback to connect information with relevant individuals and groups to promote understanding, questioning, problem solving and application to the CCDP's partnership practice.

A key component of the learning cycle initiative is to ensure information is accessible to relevant audiences. While the primary audience of the learning and

improvement strategy is the CCDP itself, the proposed learning cycles will allow feedback from other relevant groups and individuals (in and outside government). These options may involve writing technical reports, publications, interactive online maps, etc.; presenting to various CCDP team members as well as individuals in other sectors and other levels of government; and running workshops with different combinations of groups as information is interpreted and negotiated.

5. and 6. Feedback and Action—Including redesigning internal processes, structures, evaluation strategies and engagement options for multi-sectoral partnerships.

Through feedback sessions at the end of each learning cycle (Phase 5), individuals and groups at the CCDP can align new learning with potential organizational, policy and practice changes. These may include redesigning internal CCDP processes, modifying partnership brokering techniques, developing new training modules, implementing new or revised partnership governance mechanisms or revising impact and outcome assessment procedures. Each action may influence the priority learning domains (as noted in Phase 1), thereby shifting the focus for the next learning cycle. By being this flexible, the CCDP's learning and improvement strategy will remain relevant to and useful for changes in multi-sectoral partnership projects.

Discussion

Inter-organizational partnerships are an important part of Canada's initiative to address complex public health problems through preventing chronic diseases, improving healthy living and reducing health inequalities.[1,9] These partnerships try to increase the reach of evidence-based programs, leverage new resources and foster change in the health and cultures of communities and partnering organizations. This focus on partnership engagement is consistent with a recent Speech from the Throne, which signalled the government's intent to act "...on the opportunities presented by social finance and the successful National Call for Concepts for Social Finance."[58]

The CCDP's multi-sectoral initiative, which involves many traditional and non-traditional partners, is trying to achieve social and economic gains by harnessing the expertise, resources and reach of diverse partners. In this article, we describe the CCDP's approach to developing a learning and improvement strategy for multi-sectoral partnerships. While the intended user of this strategy is the CCDP itself, the strategy may be applied to other government and non-governmental groups and agencies.

The evidence-informed learning and improvement strategy for multi-sectoral partnerships we outline here is consistent with current perspectives of population health intervention research.[59,60] The CCDP's multi-sectoral partnership initiative carries the hallmarks of a population health intervention: action is preceding the science; innovations are being implemented by a team responsible for policy and practice; a broad range of relevant knowledge is used to shape and understand the initiative; the effort is underpinned by a desire for large-scale social change; and the outcomes of the initiative require time to emerge.[61] Counter to hypothesis-driven research methodologies, this type of population health intervention calls for an embedded research design that is able to rigorously capture, assess and share how such practices work, under what conditions, for whom and why.[61] It is this "learn as we go" philosophy that has informed the genesis of the CCDP's learning and improvement strategy for multi-sectoral partnerships, and which is likely relevant to other government initiatives, including those of PHAC and other government departments. Initial learning priorities, which focussed on understanding partnership reach, intended and unintended effects, and capturing practice-based knowledge, stand to make important contributions to the scientific literature related to partnerships, as well as enhance the CCDP's multi-sectoral partnership improvement efforts and the nascent efforts of other government departments in this area.

Strengths and limitations

This study has two primary limitations. First, consultations were restricted to CCDP staff and so the perspectives and experiences of others in the multi-sectoral partnership initiative have not been captured. As the learning and improvement strategy for multi-sectoral partnerships is implemented, it will be important to broaden the range of participants and include those from other branches and divisions of PHAC and from partnering organizations. Plans are in place to capture these perspectives, as they relate to reach, through data collection with external partners (from public and private sectors).

Second, the review of published frameworks, while systematic, may not be comprehensive, and there may be other relevant frameworks and models that we did not include in this study. Nevertheless, the frameworks we reviewed provide a diverse set of perspectives on the structures, functions and outcomes of multi-sectoral partnerships.

A first cycle of the strategy will focus on understanding the reach of existing partnership projects and a second on the unanticipated effects (positive and negative) of different partnership projects. Findings from both cycles will contribute to ongoing efforts to capture and learn from the practical experiences of those in the partnership initiative.

Conclusion

In this article, we outline the CCDP's approach to learning from and improving its multi-sectoral partnership initiative projects. The strategy described here provides the CCDP, and potentially others, with an evidence-informed, practical and flexible means for identifying and addressing key learning needs related to multi-sectoral partnerships in ways that meet the time-sensitive demands of those seeking to influence public policy. Multi-sectoral partnerships for complex health issues are not new, yet our understanding of them is limited. Ideally, the learning and improvement strategy for multi-sectoral partnerships described in this article will help the CCDP and others identify and fill key knowledge gaps and advance the capacity of multi-sectoral initiatives to address pressing health concerns that affect Canadians.

References

1. Johnston LM, Finegood DT. Cross-Sector partnerships and public health: challenges and opportunities for addressing obesity and noncommunicable diseases through engagement with the private sector. Annu Rev Public Health. 2015;36:255-71. doi: 10.1146/annurev-publhealth-031914-122802.

2. Woulfe J, Oliver TR, Zahner SJ, Siemering KQ. Multisector partnerships in population health improvement. Prev Chronic Dis. 2010;7(6):A119.

3. Reich MR. Public-private partnerships for public health. Cambridge (MA): Harvard Centre for Population Development Studies; 2002.

4. Provan KG, Fish A, Sydow J. Interorganizational networks at the network level: a review of the empirical literature on whole networks. J Manage. 2007;33(3):479-516. doi: 10.1177/0149206307302554.

5. Provan KG, Beagles JE, Leischow SJ. Network formation, governance, and evolution in public health: the North American Quitline Consortium case. Health Care Manage Rev. 2011;36(4):315-26. doi: 10.1097/HMR.0b013e31820e1124.

6. Provan KG, Lemaire R. Core concepts and key ideas for understanding public sector organizational networks: using research to inform scholarship and practice. Public Adm Rev. 2012;72(5):638-48. doi:10.1111/j.1540-6210.2012.02595.x.

7. Willis CD, Riley BL, Best A, Ongolo-Zogo P. Strengthening health systems through networks: the need for measurement and feedback. Health Policy Plan. 2012;27 Suppl 4:62-6.

8. Willis CD, Riley BL, Herbert CP, Best A. Networks to strengthen health systems for chronic disease prevention [Internet]. Am J Public Health. 2013;103(11):e39-e48. doi: 10.2105/AJPH.2013.301249.

9. Public Health Agency of Canada. Multi-sectoral Partnerships to promote healthy living and prevent chronic disease. Ottawa (ON): Public Health Agency of Canada; 2014 [cited 2014 May 23]. Available from: http://www.phac-aspc.gc.ca/fo-fc/mspphl-pppmvs-eng.php

10. Austin JE, Seitanidi MM. Collaborative value creation: a review of partnering between nonprofits and businesses. Part 2. Partnership processes and outcomes. Nonprof Volunt Sec Q. 2012 41(6):929-68.

11. Austin JE, Seitanidi MM. Collaborative value creation: a review of partnering between nonprofits and businesses. Part 1. Value creation spectrum and collaboration stages. Nonpro Volunt Sec Q.2012;41(5):726-58.

12. Al-Tabbaa O, Leach D, March J. Collaboration between nonprofit and business sectors: a framework to guide strategy development for nonprofit organizations. Voluntas: Int J Volunt Nonprof Org. 2013;25(3):657-78. doi: 10.1007/s11266-013-9357-6.

13. Bryson JM, Crosby BC, Stone MM. The design and implementation of cross-sector collaborations: propositions from the literature. Public Admin Rev. 2006;66(SUPPL. 1):44-55.

14. Friedman SR, Reynolds J, Quan MA, Call S, Crusto CA, Kaufman JS. Measuring changes in interagency collaboration: an examination of the Bridgeport Safe Start Initiative. Eval Program Plann. 2007;30(3):294-306.

15. Kothari A, Sibbald SL, Wathen CN. Evaluation of partnerships in a transnational family violence prevention network using an integrated knowledge translation and exchange model: a mixed methods study. Health Res Policy Syst. 2014;12(1):25 doi: 10.1186/1478-4505-12-25.

16. Kumaresan J, Heitkamp P, Smith I, Billo N. Global Partnership to Stop TB: a model of an effective public health partnership. Int J Tuberc Lung Dis. 2004;8(1):120-9.

17. Kernaghan K. Partnership and public administration: conceptual and practical considerations. Can Public Admin. 1993;36(1):57-76.

18. Butterfoss FD. Coalitions and partnerships in community health. San Francisco (CA): Jossey-Bass; 2007.

19. Asante AD, Zwi AB. Public-private partnerships and global health equity: prospects and challlenges. Indian J Med Ethics. 2007;4(4):176-80.

20. Barr DA. Ethics in public health research: a research protocol to evaluate the effectiveness of public-private partnerships as a means to improve health and welfare systems worldwide. Am J Public Health. 2007;97(1):19-25.

21. Bate SP, Robert G. Knowledge management and communities of practice in the private sector: Lessons for modernizing the NHS in England and Wales. Public Administration. 2002;80:643-63. doi: 10.1111/1467-9299.00322.

22. Beaglehole R, Ebrahim S, Reddy S, Voute J, Leeder S. Prevention of chronic diseases: a call to action. Lancet. 2007;370(9605):2152-7.

23. Galea G, McKee M. Public-private partnerships with large corporations: setting the ground rules for better health. Health Policy. 2014;115(2-3):138-40. doi: 10.1016/j.healthpol.2014.02.003.

24. Leenaars K, Jacobs-van der Bruggen M, Renders C. Determinants of successful public-private partnerships in the context of overweight prevention in Dutch youth. Prev Chronic Dis. 2013;10:E117. doi: 10.5888/pcd10.120317.

25. Mannar MG, van Ameringen M. Role of public-private partnership in micronutrient food fortification. Food Nutr Bull. 2003;24(4 Suppl):151-4.

26. Rummery K. Healthy partnerships, healthy citizens? An international review of partnerships in health and social care and patient/user outcomes. Soc Sci Med. 2009;69(12):1797-804. doi: 10.1016/j.socscimed.2009.09.004.

27. Weiner BJ, Alexander JA. The challenges of governing public-private community health partnerships. Health Care Manage Rev. 1998;23(2):39-55.

28. Widdus R. Public-private partnerships: an overview. Trans R Soc Trop Med Hyg. 2005;99 Suppl 1:S1-8.

29. Senge PM. The fifth discipline: the art and practice of the learning organization. New York: Currency; 1994.

30. Senge PM, Sterman JD. Systems thinking and organizational learning: acting locally and thinking globally in the organization of the future. Eur J Oper Res. 1992;59:137-50.

31. Kolb DA. Experiential learning: experience as the source of learning and development. Englewood Cliffs (NJ): Prentice Hall; 1984.

32. Deming WE. Out of the crisis. Cambridge (MA): MIT Press; 2000.

33. Cajaiba-Santana G. Social innovation: moving the field forward. A conceptual framework. Technol Forecast Soc. 2014;82(0):42-51.

34. Le Ber MJ, Branzei O. (Re)forming strategic cross-sector partnerships: Relational processes of social innovation. Bus Soc. 2010;49(1):140-72. doi:10.1177/0007650309345457.

35. Porter M, Kramer M. Creating shared value. Harvard Bus Rev. 2011 Jan/Feb.

36. Porter ME, Hills G, Pfitzer M, Patscheke S, Hawkins E. Measuring shared value. How to unlock value by linking social and business results. Boston (MA): FSG; 2011.

37. Bockstette V, Stamp M. Creating shared value: a how-to guide for the new corporate (r)evolution. Boston (MA): FSG; 2011.

38. Hanleybrown F, Kania J, Kramer M. Channeling change: making collective impact work [Internet]. Stanford Soc Innov Rev; 2012[cited 2015 Apr 21]. Available from: http://ssir.org/articles/entry/channeling_change_making_collective_impact_work

39. Kania J, Kramer M. Embracing emergence: how collective impact addresses complexity. Stanford Soc Innov Rev [Internet]; 2013 [cited 2015 Apr 21]. Available from: http://www.ssireview.org/blog/entry/embracing_emergence_how_collective_impact_addresses_complexity

40. Kania J, Kramer M. Collective impact [Internet]. Stanford Soc Innov Rev. 2011 [cited 2015 Apr 21]. Available from: http://www.ssireview.org/articles/entry/collective_impact

41. Preskill H, Parkhurst M, Splansky Juster J. Guide to evaluating collecting impact: assessing progress & impact. Boston (MA): Collective Impact Forum; 2013.

42. Preskill H, Parkhurst M, Splansky Juster J. Guide to evaluating collecting impact: Learning and evaluation in the collective impact context. Boston (MA): Collective Impact Forum; 2013.

43. Phills JA, Deiglmeier K, Miller DT. Rediscovering social innovation [Internet]. Stanford Soc Innov Rev. 2008;6(4):34-43.

44. Foster-Fishman PG, Nowell B, Yang H. Putting the system back into systems change: a framework for understanding and changing organizational and community systems. Am J Community Psychol. 2007;39(3-4):197-215.

45. Emerson K, Nabatchi T, Balogh S. An Integrative Framework for Collaborative Governance. J Public Admin Res Theor. 2011;22 (1):1-29.

46. Seitanidi MM, Koufopoulos DN, Palmer P. Partnership Formation for Change: Indicators for Transformative Potential in Cross Sector Social Partnerships. Journal of Business Ethics. 2010;94(S1):139-61.

47. Chen B Antecedents or processes? Determinants of perceived effectiveness of interorganizational collaborations for public service delivery. Int Public Manag J 2010;13 (4):381-407.

48. Nowell B, Foster-Fishman P. Examining mMulti-Sector Community Collaboratives as Vehicles for Building Organizational Capacity. Am J Community Psychol. 2011; 48(3-4):193-207. doi: 10.1007/s10464-010-9364-3.

49. Gulati R, Lavie D, Madhavan R. How do networks matter?. The performance effects of interorganizational networks. Res Organ Behav. 2011;31:207-24.

50. Dietscher C. How can the functioning and effectiveness of networks in the settings approach of health promotion be understood, achieved and researched? Health Promot Int. 2013. doi: 10.1093/heapro/dat067.

51. Herranz J. Multilevel performance indicators for multisectoral networks and management. Am Rev Public Admin. 2010;40 (4):445-60. doi:10.1177/0275074009341662.

52. Fawcett S, Schultz J, Watson-Thompson J, Fox M, Bremby R. Building multi-sectoral partnerships for population health and health equity. Prev Chronic Dis. 2010;7(6).

53. Woodland RH, Hutton MS. Evaluating organizational collaborations: Suggested entry points and strategies. Am J Eval. 2012;33(3):366-83. doi: 10.1177/10982140 12440028.

54. Hsu CC, Sandford BA. The Delphi Technique: making sense of consensus. Pract Assess Res Eval. 2007;12(10):1-8.

55. Glasby J, Dickinson H, Miller R. Partnership working in England—where we are now and where we've come from. Int J Integr Care. 2011 11 Spec Ed.

56. McIsaac E, Van Ymeren J. Demonstrating the results of capacity building: Final report of the Partnerships Grant Learning Project. Toronto (ON): The Mowat NFP; 2014.

57. Pawson R. The science of evaluation: a realist manifesto. London (UK): SAGE Publications Ltd; 2013.

58. Canada. Governor General. Speech from the Throne to Open the First Session of the 41st Parliament of Canada. 2013 Oct 16 [cited [cited 2015 Apr 21]. Available from: http://www.lop.parl.gc.ca/ParlInfo/Documents/ThroneSpeech/41-2-e.html

59. Hawe P, Potvin L. What is population health intervention research? Can J Public Health.2009;100(1): Suppl I8-14.

60. Rychetnik L, Frommer M, Hawe P, Shiell A. Criteria for evaluating evidence on public health interventions. J Epidemiol Community Health. 2002;56(2):119-27.

61. Hobin E, Hayward S, Riley BL, Di Ruggiero E, Birdsell J. Maximising the use of evidence: exploring the intersection between population health intervention research and knowledge translation from a Canadian perspective. Evid Pol. 2012;8(1):97-115.

Status report

The Canadian Hospitals Injury Reporting and Prevention Program: a dynamic and innovative injury surveillance system

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Abstract

This status report on the Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP), an emergency department-based injury and poisoning surveillance system, describes the result of migrating from a centralized data entry and coding process to a decentralized process, the web-based eCHIRPP system, in 2011. This secure system is improving the CHIRPP's overall flexibility and timeliness, which are key attributes of an effective surveillance system. The integrated eCHIRPP platform enables near real-time data entry and access, has user-friendly data management and analysis tools, and allows for easier communication and connectivity across the CHIRPP network through an online collaboration centre. Current pilot testing of automated data monitoring and trend analysis tools—designed to monitor and flag incoming data according to predefined criteria (for example, a new consumer product)—is revealing eCHIRPP's potential for providing early warnings of new hazards, issues and trends.

Keywords: injury surveillance, injury prevention, informatics, syndromics, epidemiology, public health

Highlights

- The Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP) has remained a flexible injury surveillance system that has adapted over time.
- Most recently, the dynamic, online eCHIRPP injury surveillance platform is improving the flexibility and timeliness of the CHIRPP.
- eCHIRPP's integrated, user-friendly data management and communication tools allow for easier information access, communication, and connectivity across the CHIRPP network.
- Pilot testing of automated data monitoring and trend analysis tools is showing eCHIRPP's potential for providing early warnings of new injury issues and trends among Canadians.

Introduction

Unintentional injuries are the leading cause of death among Canadians aged 1 to 44 years and the fourth leading cause of death among all ages combined.[1] Most injury events are not unavoidable accidents but are predictable and preventable.[2]

Health surveillance is the systematic, ongoing collection of health information and its analysis, interpretation and dissemination to make it meaningful and accessible.[3,4] Injury surveillance is vital to understanding the circumstances leading to the injuries; knowing these circumstances leads to their prevention via early warnings of new hazards and trends, public awareness campaigns and product safety legislation. Surveillance systems must therefore be dynamic[3] and evolve with changing behaviours, hazards, environments, technology and other factors. Flexibility and timeliness are key attributes of a good surveillance system.[3] Flexibility means that "[t]he system should be easy to change, especially when ongoing evaluation shows that change is necessary or desirable," and timeliness signifies that "[t]he system should be able to generate up-to-date information whenever that information is needed."[3,p.16-17]

Before 1990, national injury surveillance relied mainly on mortality and hospital administrative data. Despite their importance for measuring the incidence of the most serious injuries, these data are limited in their capture of less serious cases and the details of some injury contexts. The Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP) is an emergency department (ED)-based injury and poisoning surveillance system established in 1990 in response to the need for enhanced and timelier injury surveillance information in Canada.

The CHIRPP operates in 11 pediatric and 6 general hospitals across Canada (see Table 1) and is funded and administered by the Public Health Agency of Canada (PHAC). It collects patients' accounts of pre-event injury circumstances (narratives of "what went wrong") using the Injury/Poisoning Reporting form, a questionnaire completed during their visits

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to the ED. The attending physician or other staff add clinical data to the form, and data coders extract other information found in patients' narratives. The CHIRPP captures a more complete picture of the injury event, one that includes risk and protective factors, than hospital administrative or mortality data alone, and also identifies less serious injury cases that do not require hospitalization.

Since 1990, the CHIRPP database has accumulated nearly three million records, of which approximately 80% are pediatric.

Throughout the program's 25 years, in collaboration with Health Canada's Consumer Product Safety Directorate and other organizations, CHIRPP data have been used to develop product safety standards and legislation.[5-9] Over 100 scientific papers on a wide variety of topics cite these data.[10-16] The CHIRPP on-site directors and coordinators are also routinely consulted on shaping injury surveillance and prevention.

Examples of other hospital-based, sentinel injury surveillance systems include the United States' National Electronic Injury Surveillance System (NEISS), which produces near real-time data via a network of nearly 100 hospitals,[17] and the European Union's Injury Database (EU-IDB), which provides standardized cross-national information on the external causes of injuries treated in 100 EDs in the European Union.[18] Both of these systems can be publicly queried online and have been shown to be flexible.[19]

In this paper, we describe the CHIRPP's recent modernization to meet demands for timelier information, continued flexibility, and dynamic and integrated informatics technology that is flexible to changing business needs. (The history of the CHIRPP is described elsewhere.[20-22]) The evolution of the CHIRPP is also in keeping with the Government of Canada's agenda to strive to use "new technologies to improve networking and access to data" via "efficient, interconnected and nimble processes, structures and systems."[23]

Following a brief description of recent changes to the CHIRPP codebook (a reference manual describing the variables and codes), we discuss the innovative, web-based eCHIRPP platform and its key successes and future directions. Beyond published evaluations of some systems, including the CHIRPP, the information on modernizing injury surveillance systems is scarce.[18,19,21,24] The scarcity of knowledge on new technological tools for injury surveillance has also only recently been acknowledged,[25] so this is a timely contribution to the discussion.

The CHIRPP codebook

The CHIRPP codebook has remained flexible with changing program needs and information demands. Specifically, the CHIRPP has evolved to reduce redundancies, increase comparability to national and international injury classification and provide more detailed and timely data on essential variables and targeted topics including emerging hazards or issues and changing trends. One example, created in 2010, is an aggregated version of the external cause of injury variable based on the *International Classification of Diseases and Related Health Problems 10th Revision*,[26] which has been useful for producing summary statistics on environmental events and circumstances on the cause of injury. A validation study is planned to assess the comparability of the proportions of CHIRPP's external cause of injury data to other Canadian and international ICD-10 coded health data. Around the same time, the sports and recreation (SPAR) variable was also created for a more detailed and timely capture and analysis of any SPAR-related activity related to the injury, especially for tracking more severe injuries among youth, especially head injuries. Many new factor codes were also created to identify additional consumer products, including emerging hazards. These are just some of the examples of how the CHIRPP codebook has been modified to remain flexible over time.

CHIRPP gets connected: eCHIRPP

The most significant enhancement to the CHIRPP's flexibility and timeliness has been an electronic application. Established in 2011, eCHIRPP is one of many integrated, web-based health surveillance applications developed by PHAC's Canadian Network for Public Health Intelligence (CNPHI). CNPHI is "a comprehensive framework of applications and resources designed to fill critical gaps in Canada's national public health infostructure."[27,p.353] The ultimate goal of the CNPHI is to enhance day-to-day public health delivery by empowering public health stakeholders with innovative scientific public health informatics resources;[27] additional objectives of the CNPHI and initiatives to enhance public health surveillance are described elsewhere.[28,29]

eCHIRPP was designed for much more than data entry alone: it was developed as a single integrated platform to produce timely injury data, user-friendly data management and analysis tools, and easier communication and connectivity across the CHIRPP network and to optimize local injury surveillance at each CHIRPP site. True to CNPHI values, eCHIRPP was developed using a collaborative, program-centric, iterative approach with its end users contributing ideas to increase the application's functionality.[27]

The timeliness of data entry has vastly improved because of eCHIRPP. Its online,* dynamic nature enables data entry in near real-time at the CHIRPP hospitals; historically, this was centralized at national headquarters. PHAC coders then verify the data, code patients' narratives, complete data quality inspections and error handling, all online. This online, collaborative process allows considerably more data to be simultaneously entered into the system and is gradually decreasing lag time between data entry and information dissemination, resulting in injury information being available for analysis locally and nationally within a few days of patients presenting to the emergency room. (With the previous system of centralizing data entry at national headquarters, the lag time between data collection and data entry was up to two years because of the accumulated data entry backlog.)

eCHIRPP also has integrated data management tools that have greatly enhanced its flexibility and timeliness. For instance, authorized CHIRPP staff can directly manipulate eCHIRPP's linked codebook to periodically

*Access to the eCHIRPP platform is restricted to users whose registration is vetted and approved by the Public Health Agency of Canada and participating hospitals, and the sign-on process is secure and password-protected.

add new data elements (for example, a code for a new consumer product), and the rationale and history of changes are also automatically logged directly in eCHIRPP. These features greatly simplify and enhance autonomy over change management, ensure that historical documentation of the CHIRPP codebook is consistent and up-to-date and enable more timely capture and analysis of new issues and trends as the injury landscape evolves. Before the CHIRPP became electronic, these tasks required separate and time-consuming manual change procedures and documentation and relied on technical services personnel to manipulate data elements in the CHIRPP database. Now CHIRPP staff can make these changes and update their documentation instantaneously in eCHIRPP.

The CHIRPP sites (see Table 1) now have greater autonomy over their information: they can extract eCHIRPP data and produce statistical reports using integrated eCHIRPP data analysis and query tools, making them less reliant on national headquarters to provide data extracts and conduct analyses. In a recent poll, 82% (9 out of 11; two "undecided") of the CHIRPP sites that responded agreed/strongly agreed that they are now better equipped to efficiently respond to local information requests from media, researchers and others with an interest in injury statistics, as well as advance their own injury prevention, surveillance and research initiatives such as scientific studies and public awareness campaigns about injury prevention.

An integrated collaboration centre provides survey tools, documents management, and discussion and news forums that are simplifying access to and sharing of injury surveillance knowledge across the CHIRPP network. The system also includes an integrated print management tool that allows each eCHIRPP site to print blank Injury/Poisoning Reporting forms, eliminating the need to ship forms, and the eCHIRPP dashboard displays dynamic data entry and coding productivity statistics.

Figure 1 illustrates the CHIRPP process flow now and in the past, as well as how it is envisaged for the future.

Future directions

Timely information is critical for syndromic surveillance, the early identification of emerging hazards and changes in trends. Syndromic surveillance is "... the process of collecting, analysing and interpreting health-related data to provide an early warning of human or veterinary public health threats, which require public health action."[30,p.1] Pilot testing of CNPHI's automated data monitoring and trend analysis tools—designed to monitor and flag incoming data according to predefined criteria and thresholds (for example, a new consumer product, or a rare but serious hazard)—is showing eCHIRPP's potential for injury syndromics surveillance. In the case of rare events, a single case will generate a verifiable alert. An example of this are eye injuries caused by hockey sticks in organized minor hockey. No cases are expected because of the requirement to wear a full face shield and any generated alerts are likely to be false positives; so far, three false positives have been detected by eCHIRPP.

Syndromics surveillance was also applied to eCHIRPP data in a proof-of-concept study to analyze the effectiveness of monitoring and predicting laundry detergent packet-related injuries in Canada.[31]

Current and historical CHIRPP statistics are also provided to government and non-governmental organizations, media, academia and other stakeholders for injury prevention initiatives, and eCHIRPP has improved the timeliness of this information. Examples of injury topics that have recently been analyzed in response to such information requests include team sports, window and balcony falls, concussions, and hoverboard use statistics from the years 2015 and 2016, rather than pre-eCHIRPP statistics that were up to two years old. It was also possible to efficiently update CHIRPP sports injury statistics from 2004 to 2014[32] with estimates for 2015, in response to stakeholders' requests for the most current information.

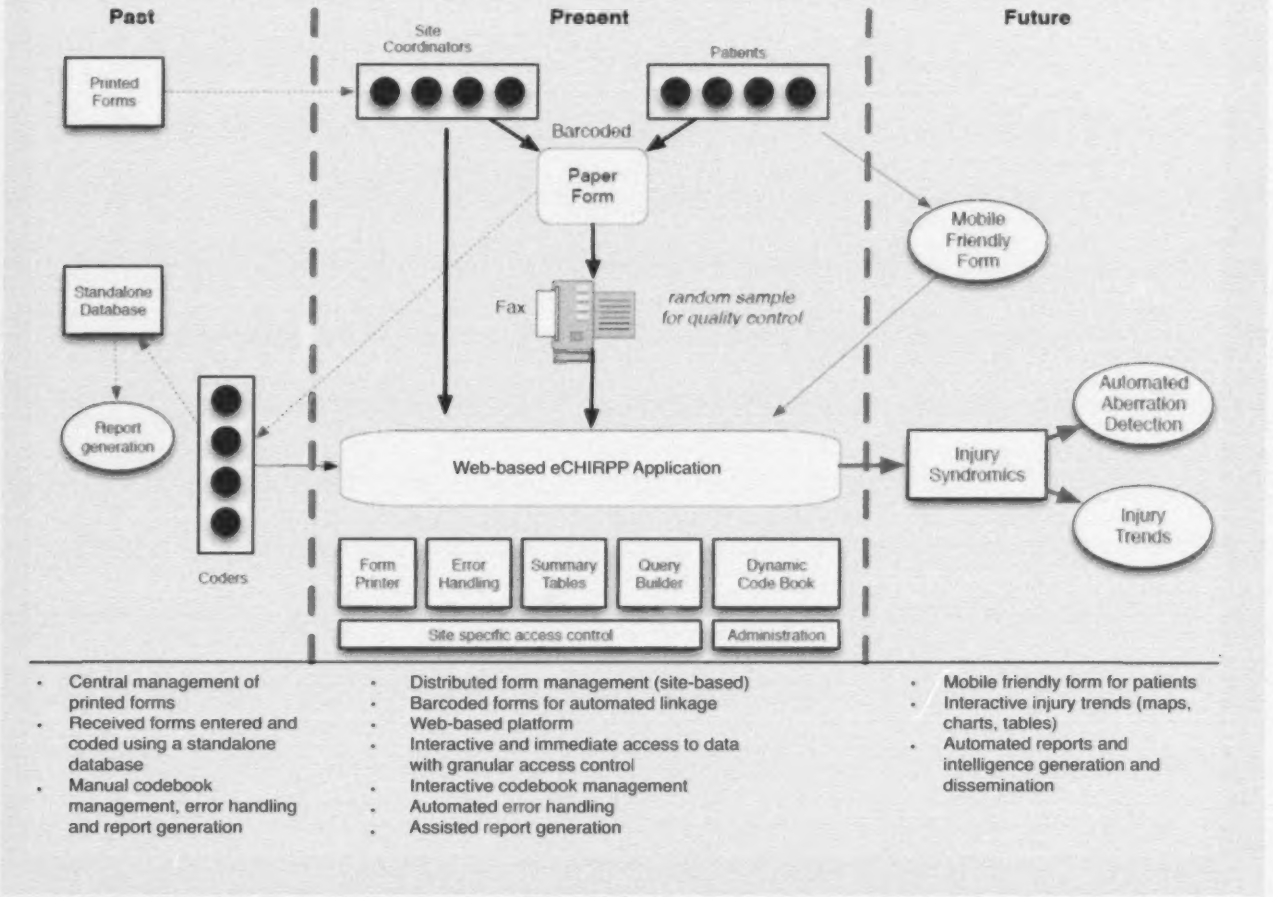
Future directions also include piloting a mobile-friendly version of eCHIRPP to collect data using hand-held devices, exploring the feasibility of integrated knowledge sharing across other CNPHI surveillance platforms, continuing assessment of applying injury syndromics for early detection of changes in trends and emerging

TABLE 1
Current CHIRPP sites

Site	Location	Joined the CHIRPP
BC Children's Hospital	Vancouver, B.C.	April 1990
Kelowna General Hospital	Kelowna, B.C.	April 2011
Alberta Children's Hospital	Calgary, Alta.	April 1990
Stollery Children's Hospital	Edmonton, Alta.	June 2009
Health Sciences Centre Winnipeg Children's Hospital	Winnipeg, Man.	April 1990
Arctic Bay Health Centre	Arctic Bay, Nun.	January 1991
Children's Hospital at London Health Sciences Centre	London, Ont.	April 1990
The Hospital for Sick Children	Toronto, Ont.	April 1990
Kingston General Hospital	Kingston, Ont.	June 1993
Hotel Dieu Hospital	Kingston, Ont.	June 1993
Children's Outpatient Centre, Hotel Dieu Hospital	Kingston, Ont.	September 2011
Children's Hospital of Eastern Ontario	Ottawa, Ont.	April 1990
Montreal Children's Hospital	Montréal, Que.	April 1990
CHU Sainte-Justine	Montréal, Que.	April 1990
Hôpital de l'Enfant-Jésus, CHU de Québec	Québec, Que.	July 1991
IWK Health Centre	Halifax, N.S.	April 1990
Janeway Children's Health and Rehabilitation Centre	St. John's, N.L.	April 1990
Carbonear General Hospital	Carbonear, N.L.	April 2011

Abbreviations: CHIRPP, Canadian Hospitals Injury Reporting and Prevention Program; CHU, centre hospitalier universitaire.

FIGURE 1
The evolution of CHIRPP: from manual data collection to innovative insights



issues, estimating denominators to calculate population rates, enhancing capture of intentional injuries, and increasing adult data collection by expanding to more general hospitals. Moreover, the interest in using eCHIRPP to enhance injury surveillance in the North is strong, which would provide a valuable opportunity to assess the unique circumstances and injury patterns of northern injuries.[33]

Limitations

Like all injury surveillance systems, the CHIRPP is not without limitations. As the program comprises a sample of Canada's hospital EDs, the data should not be used to draw conclusions about injury patterns across the entire Canadian population. However, some studies, have shown CHIRPP data to be representative of the profile of injuries in sports and recreation in Calgary, compared to regional health administrative data;[34,35] injury cases at Montreal Children's Hospital that did not require admission, did not present to the ED overnight, or were not poisonings;[21] and children with severe injuries and younger children presenting at the Children's Hospital of Ontario.[36]

Because most of the CHIRPP hospitals are pediatric (usually located in major cities), certain groups are under-represented in the data, including rural inhabitants (including some Aboriginal peoples), older teens and adults. Also, while CHIRPP captures people who are dead on arrival at the hospital, those who died at the scene or later in hospital are not included. Patients who bypass the ED registration desk for immediate treatment may not be captured as well as those who do not complete an Injury/Poisoning Reporting form. On average, the CHIRPP capture rate (percentage of eligible patients who complete a CHIRPP form) is 68%, and it is even as high as 90% to 100% at some hospitals.

The process of establishing the new eCHIRPP system itself also had various limitations. Additional time and effort was invested by CHIRPP personnel at national headquarters and the hospital sites to develop eCHIRPP training materials and protocols and undergo training and hospitals' ethics review, and the sites also had

to adapt to the increased workload when performing data entry. Network delays at the sites have also occurred periodically, and as with any system, brief, periodic service interruptions are required when system updates are performed.

Conclusion

This paper contributes to the knowledge on modernizing injury surveillance systems.

It demonstrates the CHIRPP's flexibility, showcasing recent years. Changes to the codebook reflect evolving information demands, and eCHIRPP's implementation has enabled the program to make great strides in enhancing its dynamic and flexible nature, while improving the timeliness of its information. The eCHIRPP system is also in keeping with the Government of Canada's modernization agenda, and new knowledge about injuries and their protective and risk factors will also continue to influence the CHIRPP's evolution as health surveillance must continue to adapt to changes in the populations being monitored, new knowledge and technology, and changing information demands.

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References

1. Statistics Canada. Table 102-0561. Leading causes of death, total population, by age group and sex, Canada, annual [Internet]. Ottawa (ON): Statistics Canada; [cited 2016 Apr 20]. Available from: http://www5.statcan.gc.ca/cansim/a26?lang = eng&id = 1020561.

2. Parachute. The Cost of Injury in Canada. Toronto (ON): Parachute; 2015.

3. Holder Y, Peden M, Krug E, Lund J, Gururaj G, Kobusingye O. editors. Injury surveillance guidelines. Geneva (CH): World Health Organization; 2001. Joint publication of the Centers of Disease Control and Prevention.

4. Naylor D, editor. Learning from SARS: renewal of public health in Canada. Ottawa (ON): Health Canada; 2003.

5. CSA Group. Children's playspaces and equipment. Catalogue number CAN/CSA-Z614-14. Toronto (ON): Canadian Standards Association; 2014.

6. Health Canada. Injury data analysis leads to baby walker ban [Internet]. Ottawa (ON): Health Canada; [modified 2007 Oct 10; cited 2014 Jan 24]. Available from: http://www.hc-sc.gc.ca/sr-sr/activ/consprod/baby-bebe-eng.php

7. ATV youth injuries down, Halifax MD says [Internet]. Halifax: CBC News Nova Scotia; 2011 Aug 8 [cited 2014 Jan 28]. Available from: http://www.cbc.ca/news/canada/nova-scotia/atv-youth-injuries-down-halifax-md-says-1.1007280

8. Off-highway vehicles act. R.S., c. 323, s. 1.

9. Mackenzie SG. Injuries associated with hooks in retail displays. Chronic Dis Can. 1992;13(6):116-7.

10. Forward KE, Seabrook JA, Lynch T, Lim R, Poonai N, Sangha GS. A comparison of the epidemiology of ice hockey injuries between male and female youth in Canada. Paediatr Child Health. 2014;19 (8):418-22.

11. Lindsay H, Brussoni M. Injuries and helmet use related to non-motorized wheeled activities in paediatric patients. Chronic Dis Inj Can. 2014;34:74-81.

12. Keays G, Dumas A. Longboard and skateboard injuries. Injury. 2014;45(8):1215-9. doi: 10.1016/j.injury.2014.03.010.

13. Cherniawsky H, Bratu I, Rankin T, Sevcik WB. Serious impact of handlebar injuries Clin Pediatr. 2014;53(7):672-76. doi: 10.1177/0009922814526977.

14. Pickett W, Kukaswadia A, Thompson W, et al. Use of diagnostic imaging in the emergency department for cervical spine injuries in Kingston, Ontario. CJEM. 2014;16(1):25-33.

15. Vanlaar W, McAteer H, Brown S, Crain J, McFaull S, Hing MM. Injuries related to off-road vehicles in Canada Accident Anal Prev. 2015;75:264-71. doi: 10.1016/j.aap.2014.12.006.

16. Fridman L, Fraser-Thomas JL, McFaull S, MacPherson A. Epidemiology of sports-related injuries in children and youth presenting to Canadian emergency departments from 2007–2010. BMC Sports Sci Med Rehabil. 2013;5:30. doi: 10.1186/2052-1847-5-30.

17. National Electronic Injury Surveillance System (NEISS) [Internet] Atlanta: Centres for Disease Control; c. 2012 [cited 2015 February 26]. Available from http://www.cpsc.gov/en/Safety-Education/Safety-Guides/General-Information/National-Electronic-Injury-Surveillance-System-NEISS/

18. Injury database [Internet]. Brussels: European Commission; c. 2015 [cited 2015 March 4]. Available from http://ec.europa.eu/health/data_collection/databases/idb/index_en.htm

19. Zhang K, Wang J, Mikami Y. Evaluations on several national injury surveillance systems. Appl Mech Mater. 2013;321-324: 2596-601.

20. Mackenzie SG, Pless IB. CHIRPP: Canada's principal injury surveillance program. Canadian Hospitals Injury Reporting and Prevention Program. Inj Prev.1999;5:208-13.

21. Macarthur C, Pless IB. Evaluation of the quality of an injury surveillance system. Am J Epidemiol. 1999;149(6):586-92.

22. Herbert M, Mackenzie SG. Injury surveillance in paediatric hospitals: the Canadian experience. Paediatr Child Health. 2004;9 (5):306-8.

23. Government of Canada. Blueprint 2020: Getting started – getting your views. Ottawa (ON): Government of Canada; 2013.

24. Kirkwood G, Hughes TC, Pollock AM. Injury surveillance in Europe and the UK. BMJ. 2014;349:g5337 doi: 10.1136/bmj.g5337.

25. McClure RJ, Mack K. Injury surveillance as a distributed system of systems. Inj Prev. 2015;0:1-2. doi: 10.1136/injuryprev-2015-041788.

26. World Health Organization. International classification of diseases and related health problems, 10th revision. Geneva (CH): World Health Organization; 1996.

27. Mukhi S, Aramini J, Kabani A. Contributing to communicable diseases intelligence management in Canada: CACMID meeting, March 2007, Halifax, Nova Scotia. Can J Infect Dis Med Microbiol. 2007;18(6):353-56.

28. Mukhi SN, Chester TL, Klaver-Kibria JD, et al. Innovative technology for web-based data management during an outbreak. Online J Public Health Inform. 2011;3(1): 1-13. doi: 10.5210/ojphi.v3i1.3514.

29. Mukhi SN, Meghnath K, Kuschak TI, Chu M, Ng LK. A web-based system for mapping laboratory networks: analysis of GLaDMap application. Online J Public Health Inform. 2012;4(2):1-11.

30. Syndromic surveillance. systems and analyses [Internet]. London (UK): Public Health England; [cited 2015 Jun 23]. Available from: https://www.gov.uk/government/collections/syndromic-surveillance-systems-and-analyses

31. Do MT, Cheesman J. Injury 'syndromics': a proof-of-concept using detergent packets. Inj Prev. 2015;21(Suppl 2)A1-28.

32. McFaull S, Subaskaran J, Branchard B, Thompson W. Emergency department surveillance of injuries and head injuries associated with baseball, football, soccer and ice hockey, children and youth, ages 5 to 18 years, 2004 to 2014. Health Promot Chronic Dis Prev Can. 2016;36(1):13-4.

33. Do MT, Fréchette M, McFaull S, Denning B, Ruta M, Thompson W. Injuries in the North – analysis of 20 years of surveillance data collected by the Canadian Hospitals Injury Reporting and Prevention Program. Int J Circumpolar Health. 2013;72. doi: 10.3402/ijch.v72i0.21090.

34. Pickett W, Brison RJ, Mackenzie SG, Garner M, King MA, Greenberg TL, et al. Youth injury data in the Canadian Hospitals Injury Reporting and Prevention Program: do they represent the Canadian experience? Inj Prev. 2000;6(1):9-15.

35. Kang J, Hagel B, Emery CA, Senger T, Meeuwisse W. Assessing the representativeness of Canadian Hospitals Injury Reporting and Prevention Programme (CHIRPP) sport and recreational injury data in Calgary, Canada Int J Inj Contr Saf Promot. 2013;20(1):19-26. doi: 10.1080/17457300.2012.656315.

36. Macpherson AK, White HL, Mongeon S, Grant VJ, Osmond M, Lipskie T, et al. Examining the sensitivity of an injury surveillance program using population-based estimates. Inj Prev. 2008;14:262-5. doi: 10.1136/ip.2008.018374.

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Report summary

The Direct Economic Burden of Socioeconomic Health Inequalities in Canada: An Analysis of Health Care Costs by Income Level

Social Determinants and Science Integration Directorate, Public Health Agency of Canada

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Canadian research indicates that individuals with lower incomes, less education or lower occupational skill levels tend to be less healthy than those who enjoy greater advantages in these areas.[1-3] This uneven distribution of health across different socioeconomic status (SES) groups is referred to as "socioeconomic inequality in health."

Evidence of the economic cost of health inequalities helps us understand the benefits of reducing these inequalities. However, the data needed to generate such evidence is difficult to obtain. A lack of Canadian data linking health costs and socioeconomic characteristics means that assessment of the degree to which health costs are associated with socioeconomic inequalities at the national level is limited.

In order to build evidence on the cost of socioeconomic health inequalities, the Public Health Agency of Canada worked with Statistics Canada to test the feasibility of a "bottom-up" approach to compiling national health cost data. A bottom-up approach relies on individual-level data, which allows costs to be calculated by individual-level characteristics not always found in other data sources. This includes indicators of SES such as level of education or income. In this study, the population was divided into quintiles based on income, and the health care costs incurred by these five income groups were examined for a single year (2007–2008).*

Estimates of health care costs by income level make it possible to assess one dimension of economic impact: the *direct economic burden* of socioeconomic equalities in health in Canada. The direct economic burden measures the influence of socioeconomic health inequalities on expenditures within the health care system. It represents the estimated reduction in health care costs that could result if all Canadians had the same health care utilization and cost patterns as those in the highest income quintile.†

In *The Direct Economic Burden of Socioeconomic Health Inequalities in Canada: An Analysis of Health Care Costs by Income Level*,[4] income was used as the proxy measure for SES because data linking health costs to income are more broadly available in Canada than data for other dimensions of SES. However, this approach does not imply that the presence of health care cost differences between income groups is solely due to level of income, or that income (re)distribution is the primary policy lever for reducing health inequalities.

The health care services included in this report were limited to those for which individual-level data were available at the national level, namely acute care inpatient hospitalizations, prescription medications and physician consultations (general practitioner and specialist). Together, these three services represented about one-quarter of all health care expenditures in Canada in 2007 to 2008. Expanding available individual-level data would improve the calculation of the direct economic burden of socioeconomic health inequalities.

Highlights

- **Magnitude of the direct economic burden**
  Socioeconomic health inequalities impose a direct economic burden of at least $6.2 billion annually, or over 14% of total expenditures on acute care inpatient hospitalizations, prescription medication and physician consultations.
- **Distribution of the direct economic burden**
  Canadians in the lowest income group account for 60% ($3.7 billion) of the total direct economic burden. Improving the health of the lowest SES group could have a significant impact on the costs of socioeconomic health inequalities in Canada.
- **Total costs by health care component**
  Total age-standardized costs for the three health care services in this report are $43.8 billion. Acute care inpatient hospitalizations make up 50% of this amount, prescription medications 40% and physician consultations 10%.‡

* There are some exceptions to the use of 2007–2008 as the reference year for the report. For more information, see Section 3 of the full report.
† See Figure 4 on page 21 of the full report for an illustration of the way the economic burden of socioeconomic inequalities in health in Canada was calculated.
‡ Differences in costing methods and the population groups covered by the data must be considered when comparing total cost estimates in this report with other cost estimates. For more information, see Section 4 of the full report.

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- **Socioeconomic gradient in health care costs**
  The costs of acute care inpatient hospitalizations and physician consultations generally follow a gradient, meaning that health care costs decline as income rises. Canadians in the lowest income quintile have the highest age-standardized average health care costs.
- **Comparing health care cost gradients**
  The difference in health care costs between SES groups is more pronounced between low- and middle- income Canadians than between middle- and high-income Canadians.
- **Health care cost patterns by sex**
  Health care costs are generally highest in the lowest income quintile for both women and men.
- **Health-adjusted life expectancy by income level**
  According to the World Health Organization, health-adjusted life expectancy (HALE) is defined as the "average number of years that a person can expect to live in 'full health' by taking into account years lived in less than full health due to disease and/or injury."[5] The more comprehensive HALE data included in this report revealed a socioeconomic gradient: HALE generally declines as income decreases.

Conclusion

The Direct Economic Burden of Socioeconomic Health Inequalities in Canada: An Analysis of Health Care Costs by Income Level[4] provides the first national-level estimate of the direct economic burden of socioeconomic inequalities in health in Canada. The burden is an indication of the magnitude of the costs associated with health inequalities—which in turn speaks to the significance of these inequalities for policy development. A better understanding of the direct economic burden can be helpful in considering the balance of health expenditures between prevention and treatment, as well as investments in other important social supports that facilitate healthy lifestyle choices.

References

1. Canadian Population Health Initiative. Reducing gaps in health: a focus on socioeconomic status in urban Canada. Ottawa (ON): CIHI; 2008.

2. Chief Public Health Officer of Canada. The Chief Public Health Officer's report on the state of public health in Canada: addressing health inequalities. Ottawa (ON): Public Health Agency of Canada; 2008.

3. McIntosh CN, Finès P, Wilkins R, Wolfson M. Income disparities in health adjusted life expectancy for Canadian adults, 1991-2001. Health Rep. 2009;20(4):55-64.

4. Public Health Agency of Canada. The direct economic burden of socioeconomic health inequalities in Canada: an analysis of health care costs by income level. Ottawa (ON): Public Health Agency of Canada; 2016.

5. World Health Organization. Health status statistics: mortality [Internet]. Geneva (CH): World Health Organization; [cited 2016 Apr 11]. Available from: http://www.who.int/healthinfo/statistics/indhale/en/

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Bridger NA, Desai S, Grimes R, [...] **Audcent T**, [...] **Kropp R**, et al. The Committee to Advise on Tropical Medicine and Travel (CATMAT) - a reference for Canadian paediatricians. Paediatr Child Health. 2015;20(8):437-8.

Canadian Task Force on Preventive Health Care. Recommendations on screening for developmental delay. CMAJ. 2016 Mar 29. doi: 10.1503/cmaj.151437. [Epub ahead of print]

Canadian Task Force on Preventive Health Care. Recommendations on screening for lung cancer. CMAJ. 2016;188(6):425-32. doi: 10.1503/cmaj.151421.

Mente A, Dagenais G, Wielgosz A, [...] **Jiang Y, de Groh M**, et al. Assessment of dietary sodium and potassium in Canadians using 24-hour urinary collection. Can J Cardiol. 2016;32(3):319-26. doi: 10.1016/j.cjca.2015.06.020.

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